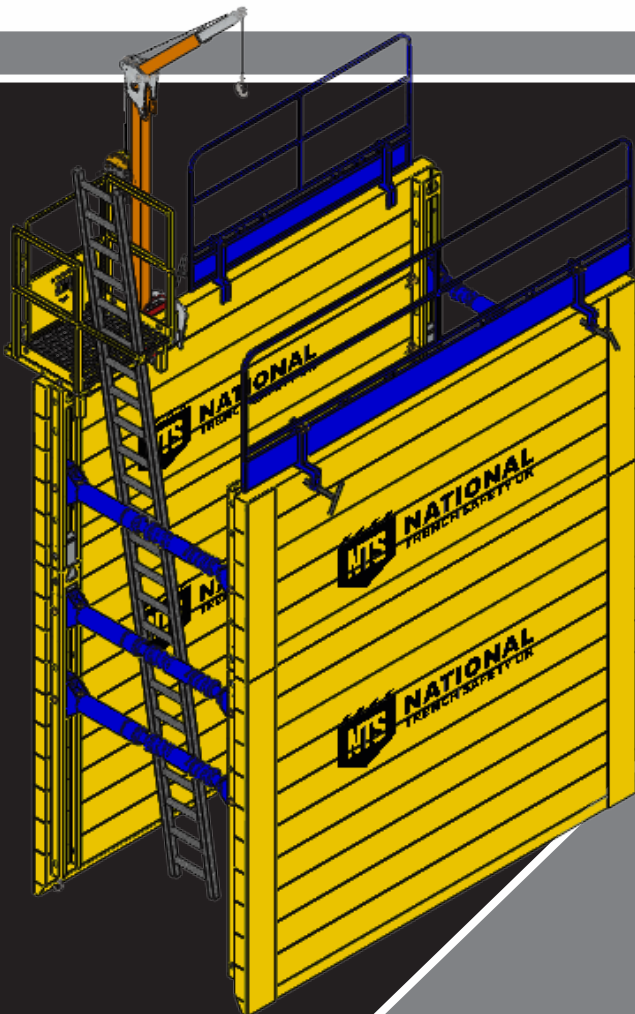




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NATIONAL TRENCH SAFETY UK

BOX SERIES 300 & 600 USER GUIDE



BOX SERIES 300 & BOX SERIES 600 USER GUIDE

Health & Safety



- **Improper assembly, installation and/or removal may cause serious injury or death.**
- **Ensure that the NTS Light Box Series 300 or Standard Box Series 600 is used in accordance with this user guide.**
- **This User Guide is to be read & understood prior to assembly, installation.**
- **Ensure all persons engaged with the assembly, installation & removal of the system are suitably qualified.**
- **DO NOT allow a void between the panel and the ground.**
- **NEVER allow anyone inside the excavation during installation or removal.**
- **Non-compliance with this user guide may cause serious injury or death.**

Prior to any use, this user guide must be read carefully and understood by all those involved with the assembly, handling, installation, and removal of the excavation support system. This installation guide is to be followed during all stages of assembly, installation & removal.

NTS UK are not liable for the use of the trench support system in any way other than that described in this user guide, use in any other way may cause serious injury or death.

Any use of the excavation support system not detailed in this user guide must be highlighted by a specific design & site-specific instructions by NTS UK, use of the system outside the scope of this guide without the above is not valid.

PERSONAL PROTECTION EQUIPMENT (PPE)	
	WEAR SUITABLE PROTECTIVE GLOVES
	WEAR SUITABLE HEAD PROTECTION
	WEAR SUITABLE PROTECTIVE FOOTWEAR
	USE SUITABLE EYE PROTECTION
	USE SUITABLE HEARING PROTECTION

HAZARDS	
	GENERAL CAUTION/WARNING (E.G. DEEP EXCAVATION)
	RISK OF CRUSHED HANDS


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	NTS (UK), UNIT 28 MOOR LANE TRADING ESTATE, MOXON WAY, LEEDS, LS25 6ES. 03332 076 007
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Table of Contents

1.	General Guidance Notes.....	4
	1.1. Lifting & Transportation	4
	1.2. Measures to reduce hazards.....	4
	1.3. Personnel	5
	1.4. Maintenance and repair.....	5
	1.5. Small Plant, Tools, and Lifting Chains	5
	1.6. Access & Egress and Edge Protection	5
	1.7. During Installation Works	5
	1.8. After Installation Works.....	5
	1.9. Return of Equipment Off-Hire	5
	1.10. Transportation.....	6
	1.11. Stacking Arrangement.....	6
	1.12. Site Storage	6
2.	Light Box Series 300 System Drawing	7
	Standard Box Series 600 System Drawing	8
3.	Technical Parameters	9
	3.1. Light Box Series 300	9
	3.2. Standard Box Series 600	9
	3.3. Allowable Earth Pressures	10
	3.4. Spindles	11
	3.5. Accessories	11
4.	Assembly Instructions	12
	4.1. Light Box Series 300 & Standard Box Series 600 Assembly	12
5.	Installation Instructions	13
	5.1. Installation of the base boxes	14
	5.2. Installation of top boxes	15
	5.3. Isometric Drawing	16
	5.4. Before Entering the Trench.....	17
	5.5. Entering the Supported Trench.....	17
	5.6. Extraction of Boxes.....	18
	5.7. Precautions During Use and Maintenance	18

1. General Guidance Notes

Ensure observance of the permissible max stress limits. The front parts should be sloped, appropriate to ground conditions.

The following sets of rules and regulations in their current versions are to be observed:

- **Regulations of the BG Technical Committee for Civil Engineering**
- **DIN 4124 Excavations and Trenches**
- **DIN EN 13331 Part 1 & 2 Trench Lining Systems**
- **Rules for Occupational Health and Safety**
- **Accident prevention regulations / Occupational health and safety regulations**

Follow the instructions in this manual during installation.

This guide is to be used as a supplementary document to the Contractor's RAMS. All site operations are the responsibility of the Contractor, and this guide is intended as guidance for use with the Lightweight Box Series 300 & Standard Box Series 600 ONLY and should be used in conjunction with any/all design documentation & drawings provided by NTS UK and any site assistance NTS UK have provided.

1.1. Lifting & Transportation

The shoring unit is to be slung only by means of the dedicated lifting rings & openings or accessories.

- **Lifting tackle must be suitable for the weight to be transported.**
- **For safety reasons, you must only use load hooks equipped with hook locks.**
- **Ensure the observation of the permissible traction limits.**
- **Transportation is to be carried out close to the ground and unnecessary swinging motions are to be avoided.**
- **Standing in the swivel range of the lifting device or under suspended loads is prohibited.**
- **Look out for overhead wires.**
- **The machine operator and banksman must maintain eye contact.**

ALL LIFTING, HANDLING & TRANSPORTATION OPERATIONS FALL UNDER THE RESPONSIBILITY OF THE CONTRACTOR & THEIR RAMS. THE ABOVE POINTS ARE TO AID THE USER IN THE SAFE LIFTING & TRANSPORTATION OF THE SYSTEM. ALL LIFTING TRANSPORTATION OPERATIONS ARE THE RESPONSIBILITY OF THE CONTRACTOR.

1.2. Measures to reduce hazards

- **The construction site must be adequately secured and signposted.**
- **If necessary, the adjacent flow of traffic is to be ensured using additional security personnel.**
- **Personnel must wear protective work clothing (helmet / safety shoes / gloves).**
- **Possible instabilities as a result of wind load must be taken into consideration during assembly or installation.**
- **Set the shoring units flat on a solid surface.**
- **In the case of sloping, pay special attention to stable storage of pre-assembled building components.**

1.3. Personnel

The Management of Health and Safety at Work Regulations require that personnel deployed are suitably trained, experienced, and supervised by a competent person. All lifting operations are to be controlled by an appointed person.

The main activities associated with Lightweight Box Series 300 & Standard Box Series 600 use are:

- **Unloading and loading the delivery vehicle.**
- **Bolting up and pinning components together.**
- **Slinging and lifting the Lightweight Box Series 300 & Standard Box Series 600 into position.**

1.4. Maintenance and repair

- **Shoring units should always be checked for functionality before use.**
- **Keep all nuts and bolts tight and ensure all pins are correctly fitted with 'R' Clips, where required.**
- **Defective or deformed units must not be used.**
- **You can repair slight damage yourself after consulting with NTS. Alternatively, you can take advantage of our service at our depots, if required.**
- **Only use original replacement parts by NTS for repairs**

1.5. Small Plant, Tools, and Lifting Chains

Lifting chains of suitable lifting capacity, hook size, leg length and current certification should be used. A small lump hammer may be required to tap pins and 'R' clips into position.

1.6. Access & Egress and Edge Protection

Install the edge protection as soon as possible before entry into the excavation. A competent person should inspect the means of access and egress regularly.

1.7. During Installation Works

Lifting chains of suitable lifting capacity, hook size, leg length and current certification should be used. A small lump hammer may be required to tap pins and 'R' clips into position.

1.8. After Installation Works

Each excavation and Lightweight Box Series 300 & Standard Box Series 600 must be inspected daily before personnel begin work.

1.9. Return of Equipment Off-Hire

Clients should ensure that on removal, the equipment is returned clean and assembled as supplied.

1.10. Transportation

Ensure all equipment is loaded to the satisfaction of the vehicle driver and is securely restrained to the vehicle bed.

(Min. 3 straps per stack is recommended).

1.11. Stacking Arrangement

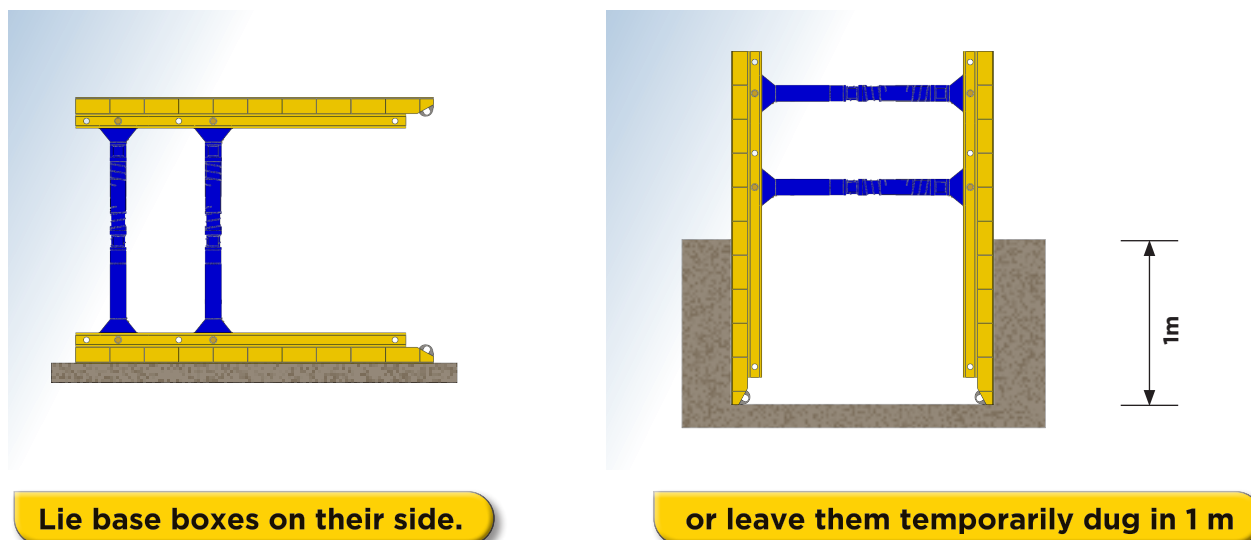
Base and top panels should be stacked as shown with suitable timber dunnage. (Max 6 panels per stack). Strut components and pins, etc. Should be stored in skips / bins. During transportation stacks should be securely restrained to the vehicle bed.



1.12. Site Storage

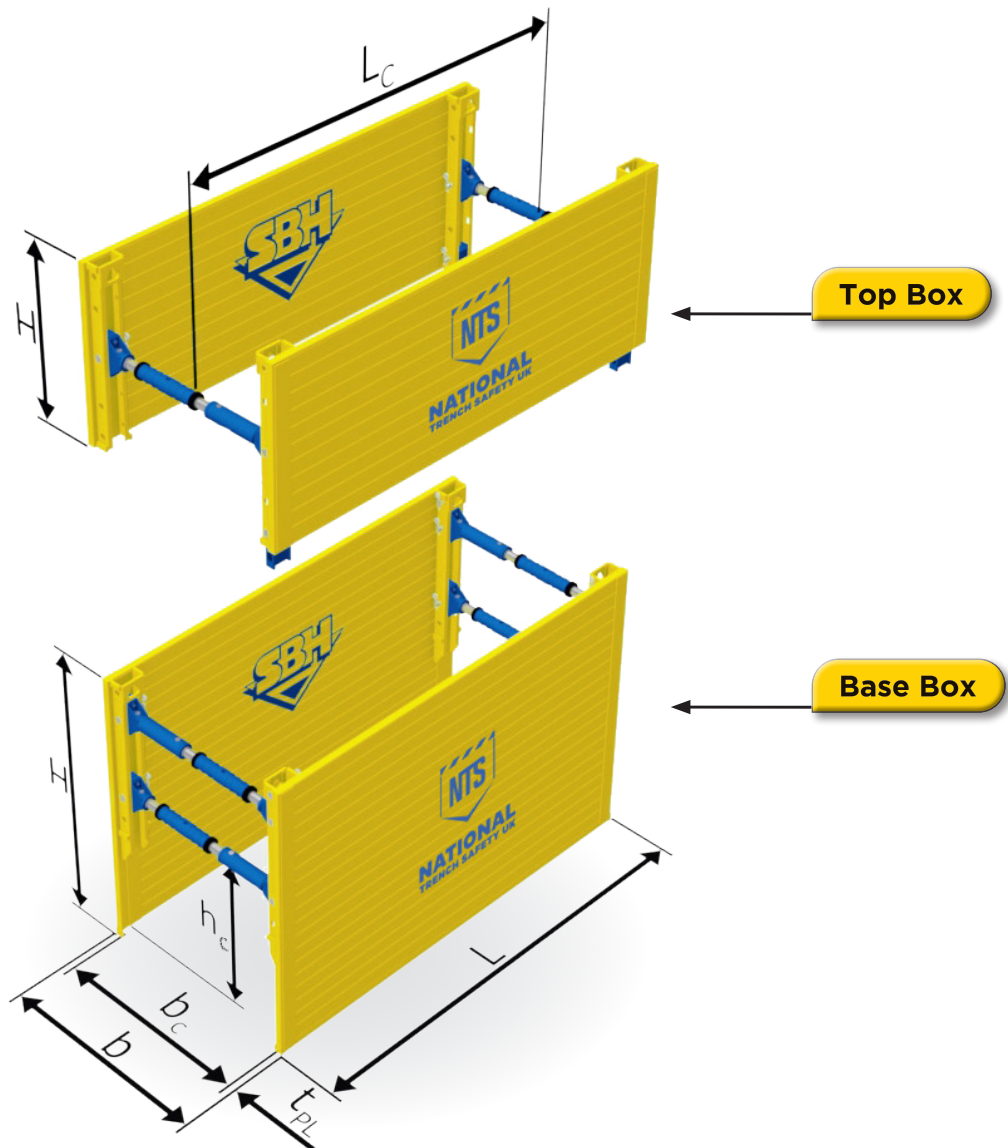
Ensure all equipment is loaded to the satisfaction of the vehicle driver and is securely restrained to the vehicle bed.

(Min. 3 straps per stack is recommended).



2. Light Box Series 300 System Drawing

- H plate height
- t_{pl} plate thickness
- h_c spindle clearance height
- L plate length
- L_c spindle clearance length

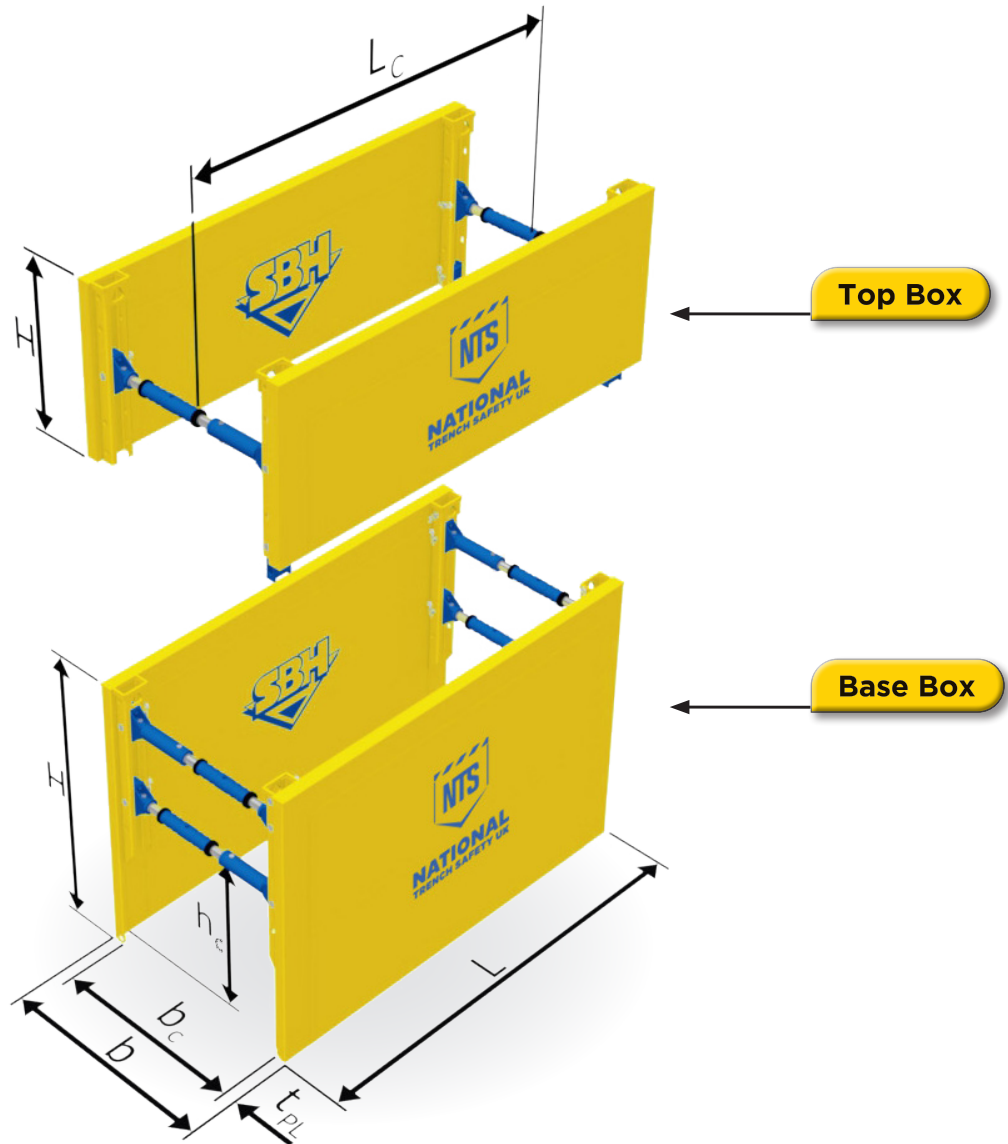


PANEL LENGTH - L (m)	PANEL HEIGHT - H (m)	PIPE CLEARANCE - L_c (m)	PIPE CLEARANCE - H_c (m)	MAX PERM EARTH PRESSURE (kN/m ²)	WEIGHT PER BOX based on 1m internal* (kg)
3.0	2.0	2.6	1.12	31.8	1385
	1.0		N/A		870
	2.4		1.12	26.0	1575
	1.4		N/A	31.8	960

* Maximum internal width = 4.26m

2. Standard Box Series 600 System Drawing

- H plate height
- t_{pl} plate thickness
- h_c spindle clearance height
- L plate length
- L_c spindle clearance length



PANEL LENGTH - L (m)	PANEL HEIGHT - H (m)	PIPE CLEARANCE L_c (m)	PIPE CLEARANCE H_c (m)	MAX. PERM. EARTH PRESSURE (kN/m ²)	WEIGHT PER BOX based on 1m internal* (kg)
3.5	2.6	3.1	1.5	40.7	2320
	1.4		N/A		1350
5.0	2.6	4.6	1.5	30.3	3360
	1.4		N/A		2050

* Maximum internal width = 4.26m

Technical Parameters

3.1 Light Box Series 300

The NTS Light Box combines a light plate construction with a flexible spindle. This makes this type of trench shoring so perfect for small to medium trench shoring projects and for the use of light construction machinery. This trench shoring is also suitable when the ground is not stable. The flexible spindle makes it suitable for the installation with the “cut and lower” method.

The light box is mostly used for supply lines, house connections and cable laying.

The robust construction of the side profiles allows higher strut clearances compared to the light weight trench shoring and the spindle we use with this type of trench shoring allows greater trench widths.

- **One size is available: 3.0m long**

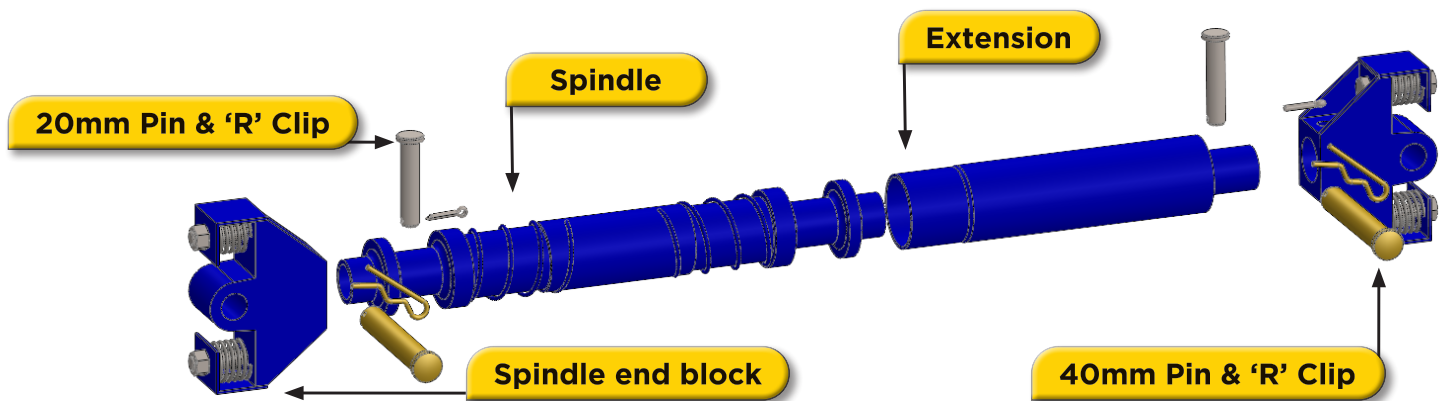
Maximum depth of excavation is 4.0m (1 base box & 2 top boxes)

3.2 Standard Box Series 600

The NTS Standard Box Series 600 is the power package among the trench shoring boxes. This robust and long-lasting trench shoring box is equipped with an extremely reinforced top to resist the high loads when lowering.

Moreover, the durable plate cutting edge allows the cutting of even firm soil. In order to minimise deformations the side profiles have been equipped with additional bars. The flexible spindle allows the installation in non-stable grounds with the “cut and lower” method. The Standard Box is suited especially for supply lines in depths of 2.00 - 4.00 m. The safe working loads exceed the presumed conditions on site by far.

- **Two sizes are available: 3.5m & 5.0m long**
- **Maximum depth of excavation is 5.4m (1 base box & 2 top boxes)**



3.4 Spindle type 031/085 blue

allowed moment = 1,7 kNm

allowed tensile force = 218 kN

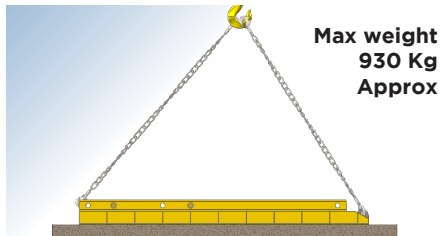
NUMBER OF EXTERNAL PIPES in 0,50m	WORKING WIDTH B _c		ALLOWED COMPRESSIVE FORCE (kN)	WEIGHT TOTAL (kg)
	MIN (m)	MAX (m)		
0	0,98	1,26	468	65,0
1	1,48	1,76	403	84,8
2	1,98	2,26	348	104,6
3	2,48	2,76	299	124,4
4	2,98	3,26	254	144,2
5	3,48	3,76	210	164,0
6	3,94	4,26	165	183,8

3.5 Accessories

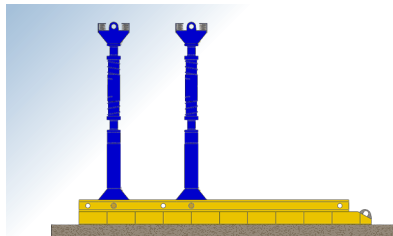
NO.	DESCRIPTION	FOR USE WITH	DIMENSION (mm)	WEIGHT (kg)
1	Spindle end block	Spindle	95 X 290 x 193	13.1
2	Spindle	Shoring plates		40.2
3	Extension	Spindle	Dia - 120mm	See table above
4	Dowel and 'R' clip	All	70	7.6

4. Assembly Instructions

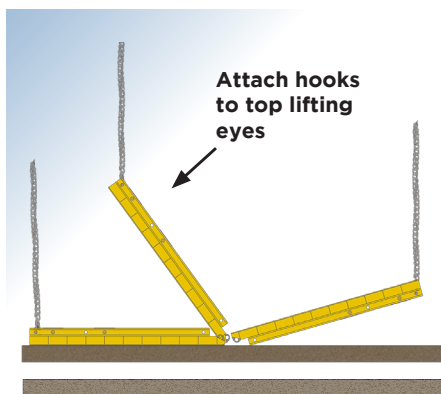
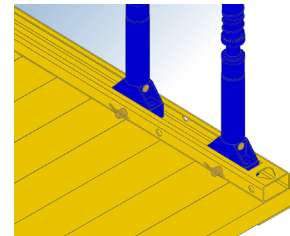
4.1. Lightweight Box 300 & Standard Box Series 600 Assembly



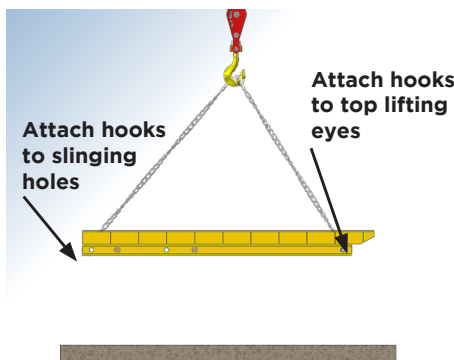
1 Lie first base panel flat on ground with spindle connector points upwards.



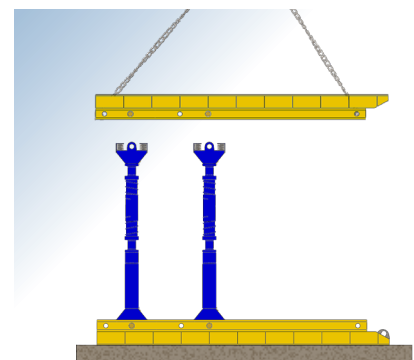
2 Assemble fixed length strut to the base panel using 20mm pins and 'R' clips.



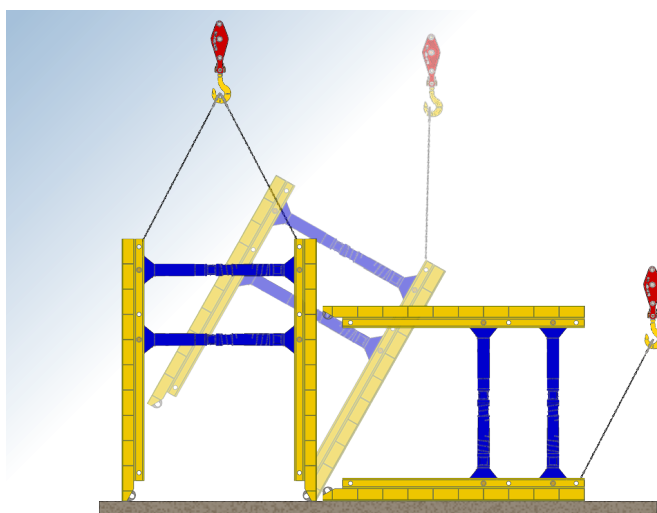
3 Turn the other base panel over using 2 legs of the four leg sling.



4 Re-sling this panel with the wings downwards (Use all 4 legs of the lifting chain)



5 Complete assembly of the base box on it's side by pinning the struts to the upper panel. Remove the 4 leg sling.



6 Attach 2 chains of the sling to UPPER lifting eyes of UPPERMOST panel and 2 chains of sling to UPPER lifting eyes on LOWER panel.

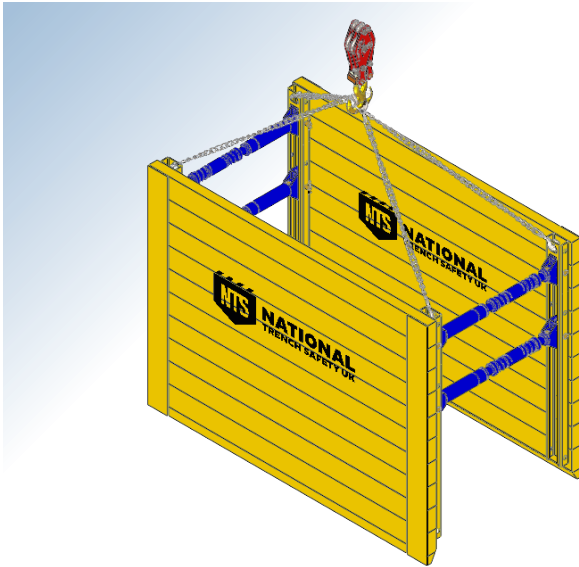
7 Stand the box on it's cutting edges with great care to avoid damaging the struts.

8 It is important to ensure the weights and radius are well within the lifting capacity of the machine to allow for impact and lurching effects as the box is turned upright.

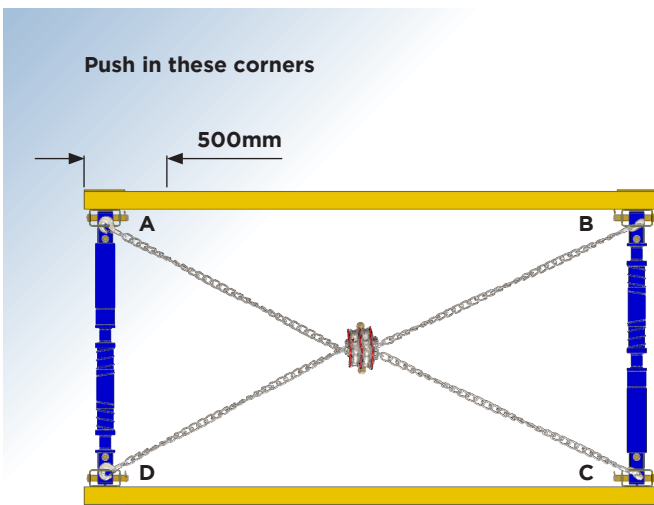
9 The completed base box can now be installed.

5. Installation Instructions

5.1. Installation of Base Boxes



1 After standing upright check all pins and safety clips are in place. Lift the box using the four leg chain sling attached to the lifting points at the top of each panel.



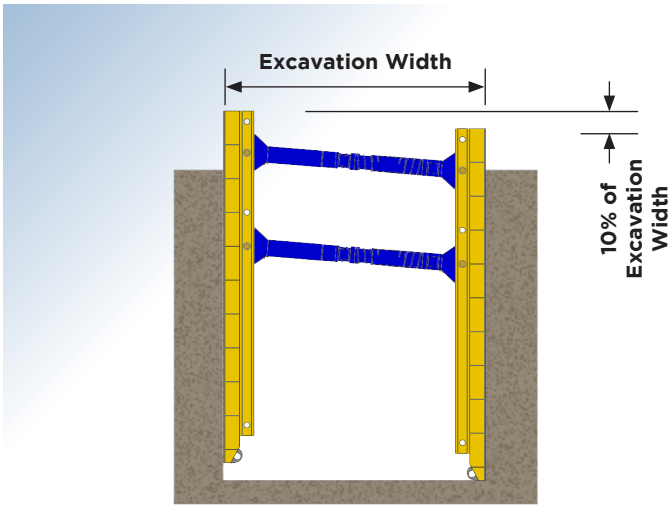
2 Dig the trench approx. 600 - 1 000mm deep to the correct width, and using the 4 leg chain sling place the box into the trench.

3 By digging between the box panels and pushing down on the ends of the panels, the box can be installed to the correct depth.

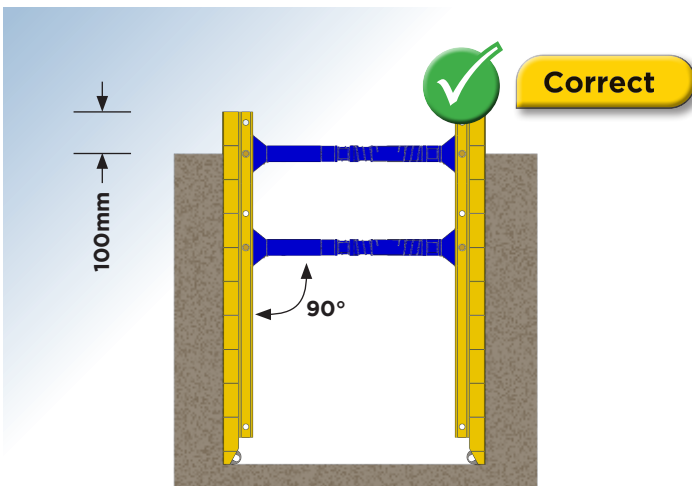
4 Always dig below the panels before pushing down. Push only on the end 500mm of each panel and never in the middle.

5 When pushing the box panels down, always push down in the sequence shown and never diagonally across corners. i.e. push A then B followed by C then D, and not A then C or B then D.

5.1. Installation of Base Boxes

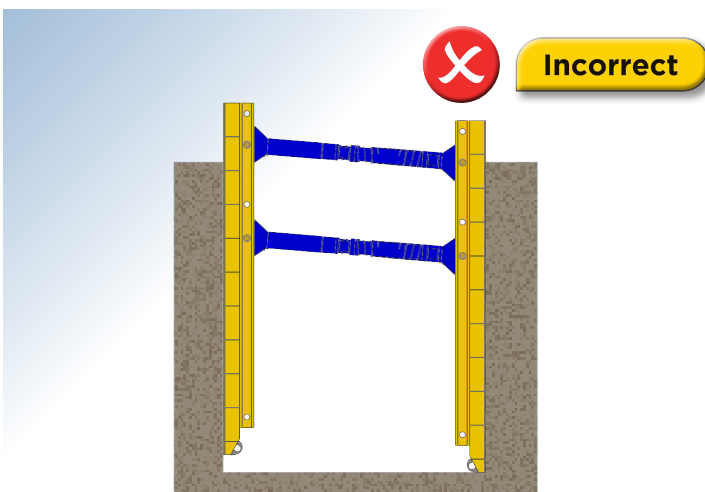


6 During the 'dig and push' operation (3.) restrict the advance of one panel over the other to 10% of the trench width .

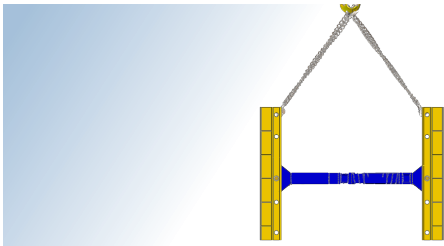


7 When the required excavation level is reached and the box sunk to full depth, ensure that the struts are horizontal and at right angles to the panels before entering the trench.

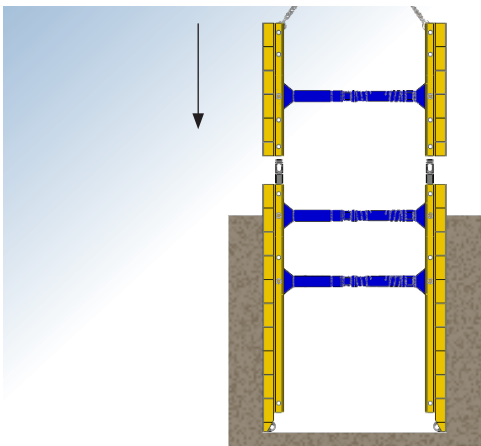
DO NOT use any unsupported part of the excavation for access. Leave the top of the box 100mm above the surrounding ground level.



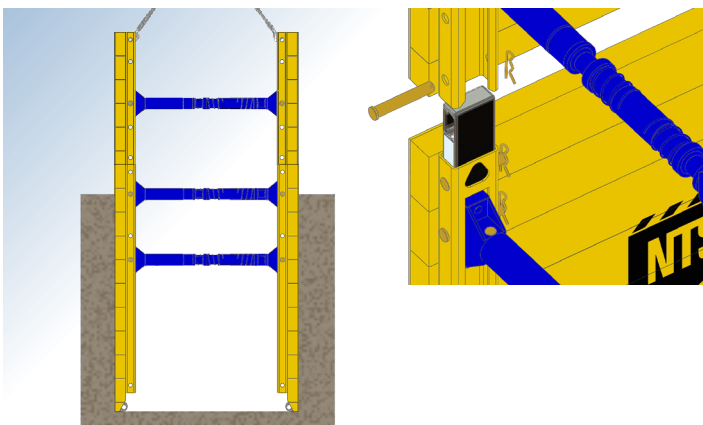
5.2. Installation of Top Boxes



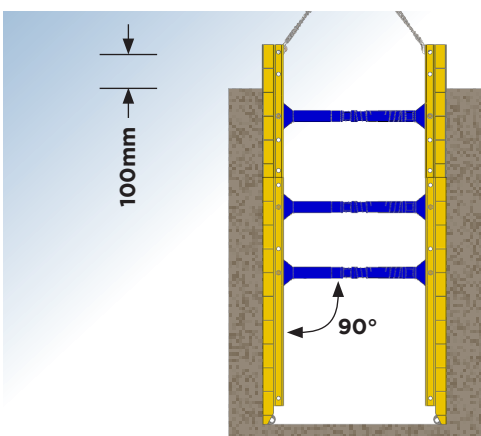
- 1 Dig and Push base box to within say 300mm of top of base box.
- 2 Fit box connectors and $\text{Ø } 20 \times 150$ mm pins & 'R' clips.
- 3 Pre-assemble the top box to the trench width and suspended by the four lifting rings on the posts.



- 4 Align the top box and lower into position over the Base Box. Ensure connectors locate in top panel end posts.



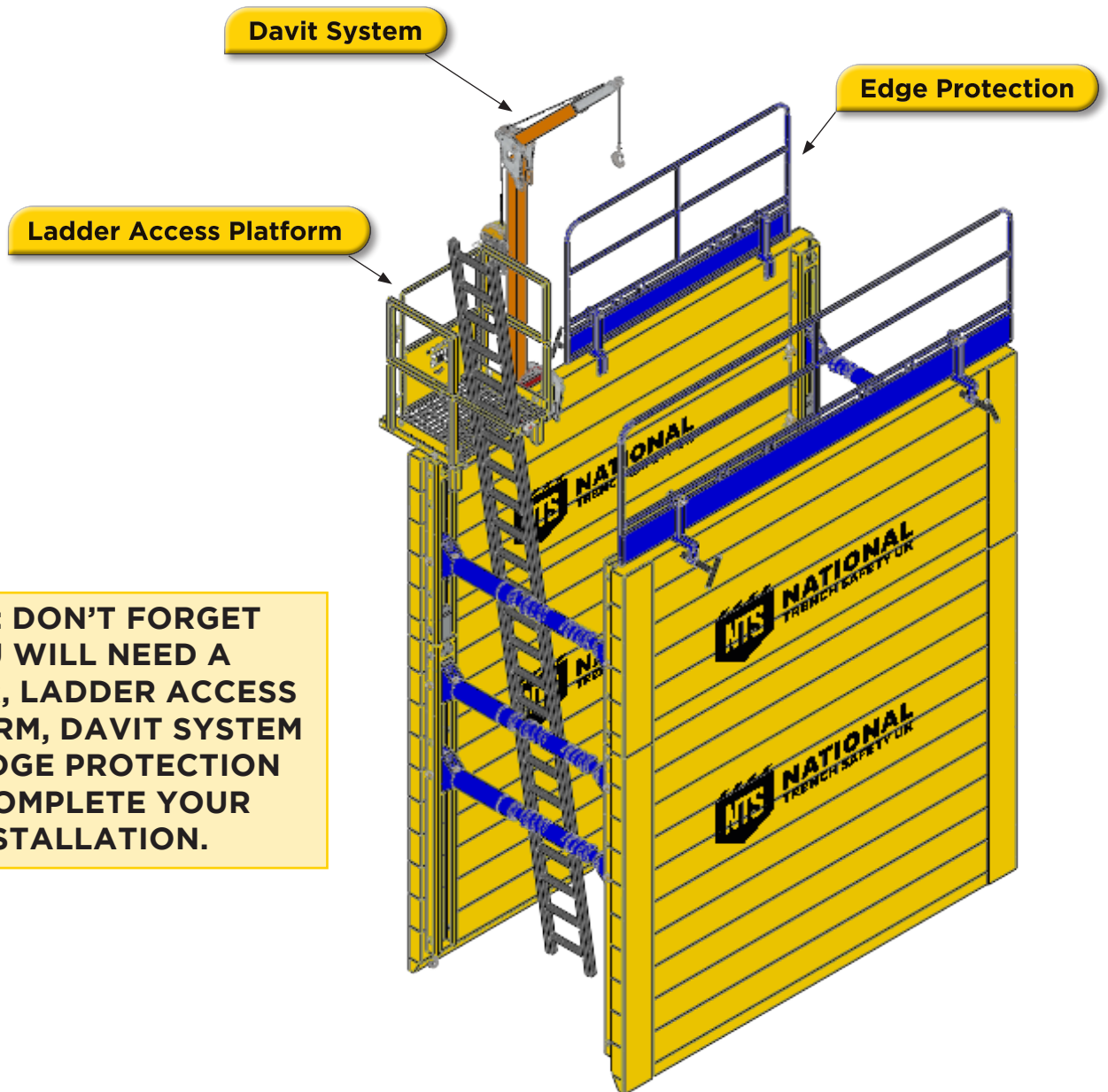
- 4 Attach the top box to the base box using box connectors and $\text{Ø } 20 \times 150$ mm pins & 'R' clips.



- 5 Continue the dig and push operation until the required excavation level is reached. Ensure all the struts are horizontal and at right angles to the panels before entering the excavation.

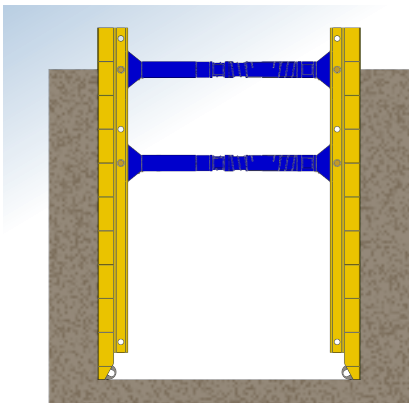
DO NOT use any unsupported part of the excavation for access. Leave the extension 100mm minimum above the surrounding ground level.

5.3. Isometric Drawing

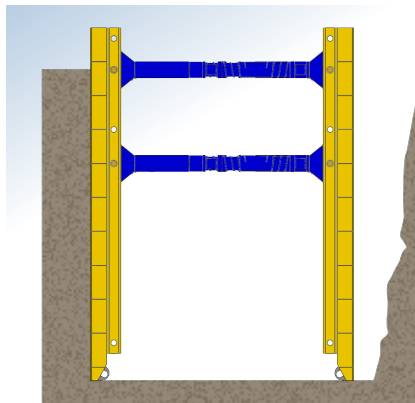


NOTE: DON'T FORGET YOU WILL NEED A LADDER, LADDER ACCESS PLATFORM, DAVIT SYSTEM AND EDGE PROTECTION TO COMPLETE YOUR INSTALLATION.

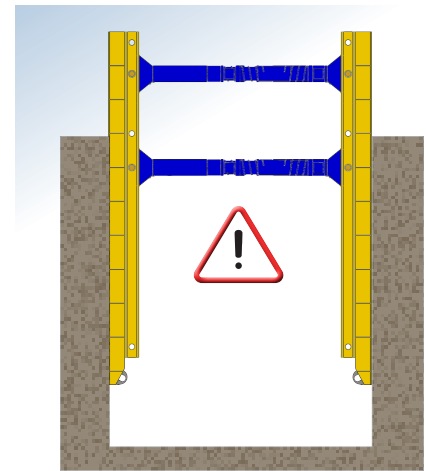
5.4. Before Entering the Trench



Correct



Incorrect



1 Ensure that there are **NO** voids between the box panel and the trench sides as this may cause the box to move sideways.

2 **DO NOT** leave the base of the box 'flying' above the trench level.

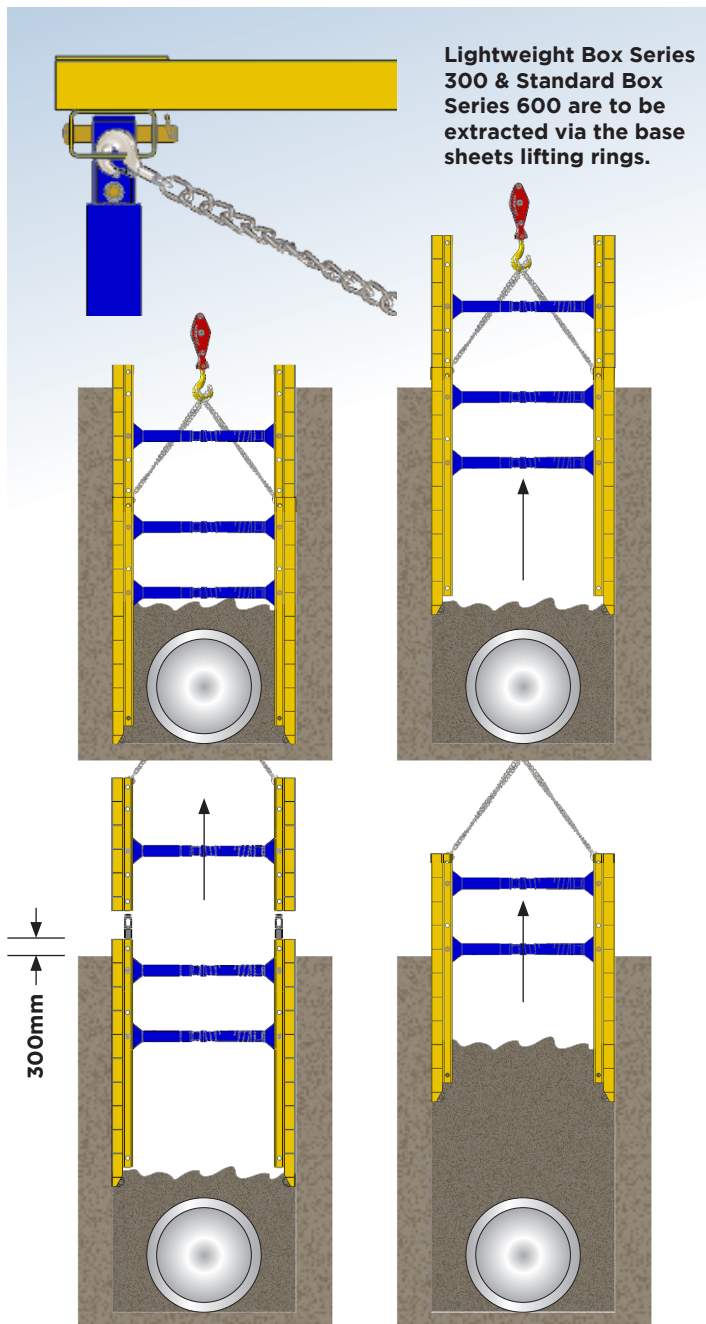
5.5. Entering the Supported Trench

1 Use a ladder to enter the working space between the struts of the Boxes.

- **DO NOT** climb up or down the struts.
- **DO NOT** use any unsupported part of the trench for access.
- **DO NOT** move the box when personnel are inside it.
- **Wear a safety helmet to minimise the risk of injury.**
- **Ensure that the excavator operator is aware of your intentions.**

NOTE: DON'T FORGET you will need a ladder, ladder access platform and trench protection to complete your installation.

5.7. Extraction of Boxes



Due to the consolidation of the ground against the modules, it is usually more difficult to extract Lightweight Box Series 300 or Standard Box Series 600 than to insert them. Methods for extracting are as follows, remembering that all lifting must be done at the points provided.

- 1** After initial backfilling and compaction, lift the base box complete with extension box if fitted from the trench using the 4 leg chain attached to all 4 upper lifting points of the two BASE panels. Continue backfilling as removal of the box proceeds.
- 2** Alternatively, if the extension box is to be removed from the base box, lift as per (1) until the top of the base box is approx. 300mm above ground level.
- 3** Remove the 2 no. corner pins securing one of the extension panels to the base and the 2 no. pins securing one of the extension panels to the struts.
- 4** Lift the panel from the base. Remove the two no. corner pins securing the other extension panel to the base and lift this panel complete with struts off the base.
- 5** Remove the struts from the extension panel and stack panels and struts as per section 8. Continue backfilling as removal of the base proceeds.

DO NOT remove the extension panels before the top of the base is above ground level.

NOTE : No personnel should be inside the Lightweight Box Series 300 & Standard Box Series 600 whilst extraction is in progress.

5.7. Precautions During Use and Maintenance

- 1** Regularly check all pins are in place and 'R' clips are fitted.
- 2** Avoid laterally loading the struts - either by hanging or propping from them or by accidentally striking them with site plant. Damaged struts should not be used.

CLIENTS SHOULD ENSURE THAT ON REMOVAL, THE EQUIPMENT IS RETURNED CLEAN AND ASSEMBLED AS SUPPLIED.